

July 18, 2003

FCC ID# H8NWLL220C

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Correspondence Reference Number: 25415
731 Confirmation Number: EA 894595

SAR Report originally submitted March 20, 2003

2. *Regarding your answer to question 2, please confirm that the WLAN card manual will be provided to the user of the laptop. If not please provide the RF safety statements in the laptop manual. This grant will be for the laptop computer with built in WLAN card.*

Response:

Revised Notebook Users Manual has been uploaded to you.

4. *Please provide SAR vs. power covering the system dynamic range to both a CW signal and a signal with similar modulation and BW as that transmitted by the device with the equivalent CW power.*

Response:

As previously explained in our response dated June 6, 2003 to a similar question, the passband of our SAR measurement system extends from 20 Hz to 300 kHz. This passband is more than sufficient to read all of the frequency components associated with OFDM or any of the other modulations that may be used for the 802.11a band.

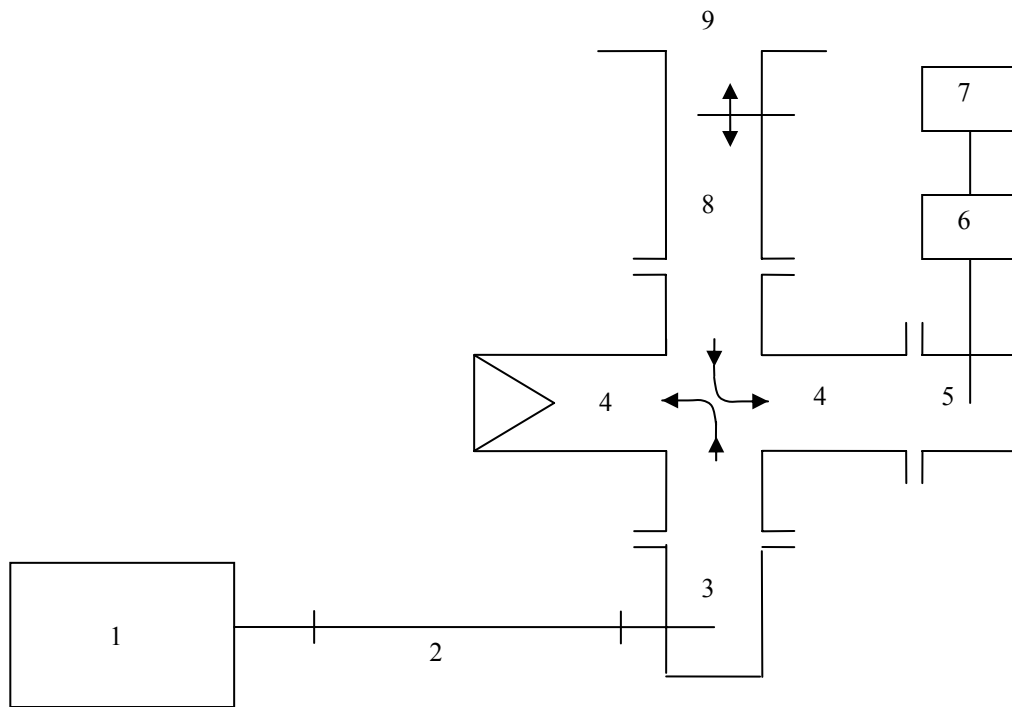
Additional experiments have however, been done to compare the SAR measured at one of the points in the planar phantom for OFDM modulated signals from the WLL 220 Mini PCI card and comparing the same with the CW signal of similar time-averaged power levels obtained from the Hewlett Packard (HP) Model 83620 A synthesized Sweeper (10 MHz – 20 GHz). For each of the two RF sources, the power output was measured using a HP Model 8482 A power sensor with HP Model 436 A power meter (see Fig. A). As shown in Figure A, the irradiation system uses a WR 187 rectangular waveguide (see Fig. B) which is placed at a distance of 8 mm below the base of the planar phantom (10 mm from the lossy fluid in the phantom.) used for SAR measurements (see Fig. 5 of the previously submitted SAR report dated March 20, 2003).

Shown in Figs. C and D is a comparison of the SARs measured for a given location in the planar phantom for CW and 802.11a band modulated signals for turbo mode at 5.29 GHz and base mode at 5.32 GHz, respectively. An excellent agreement in the SAR reading is observed whether CW, or modulated signals are used. This is due the broad bandwidth (20 Hz to 300 kHz) of the system used for measuring rectified signals from the E-field probe.

6. *Updated SAR plots.*

Response:

The updated summary of SAR measurements is attached here as Table A. This is the updated version of the data given in Table 11 of the previously submitted SAR reports.



1. Hewlett Packard (HP) Model 83620A Synthesized Sweeper (10 MHz-20 GHz) for CW signals or modulated signals.
2. Coaxial line.
3. Coaxial to waveguide adapter.
4. 20 dB crossguide coupler (may be reversed to measure incident power).
5. HP Model G281A coaxial to waveguide adapter
6. HP Model 8482A power sensor.
7. HP Model 436A power meter.
8. Narda Microline[®] Slide Screw Tuner Model 22CI.
9. Radiating open end of the waveguide.

Fig. A. The microwave circuit arrangement used for comparison of SAR for CW or modulated signals.

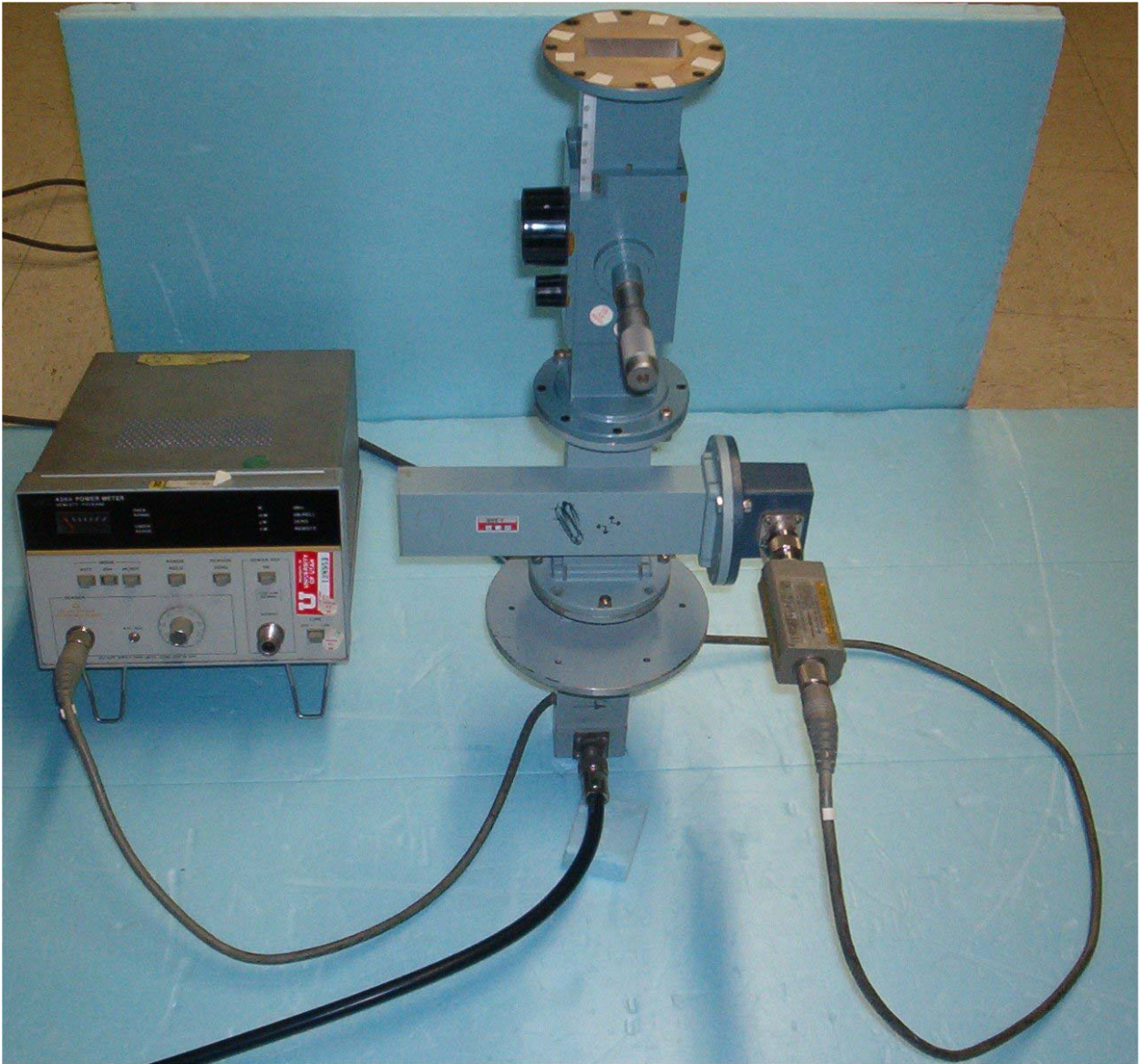


Fig. B. Photograph of the rectangular waveguide radiator used for comparison of SAR for CW or modulated signals. Also seen is the Narda Model 22CI movable slide screw tuner used to match the input power to the planar phantom.

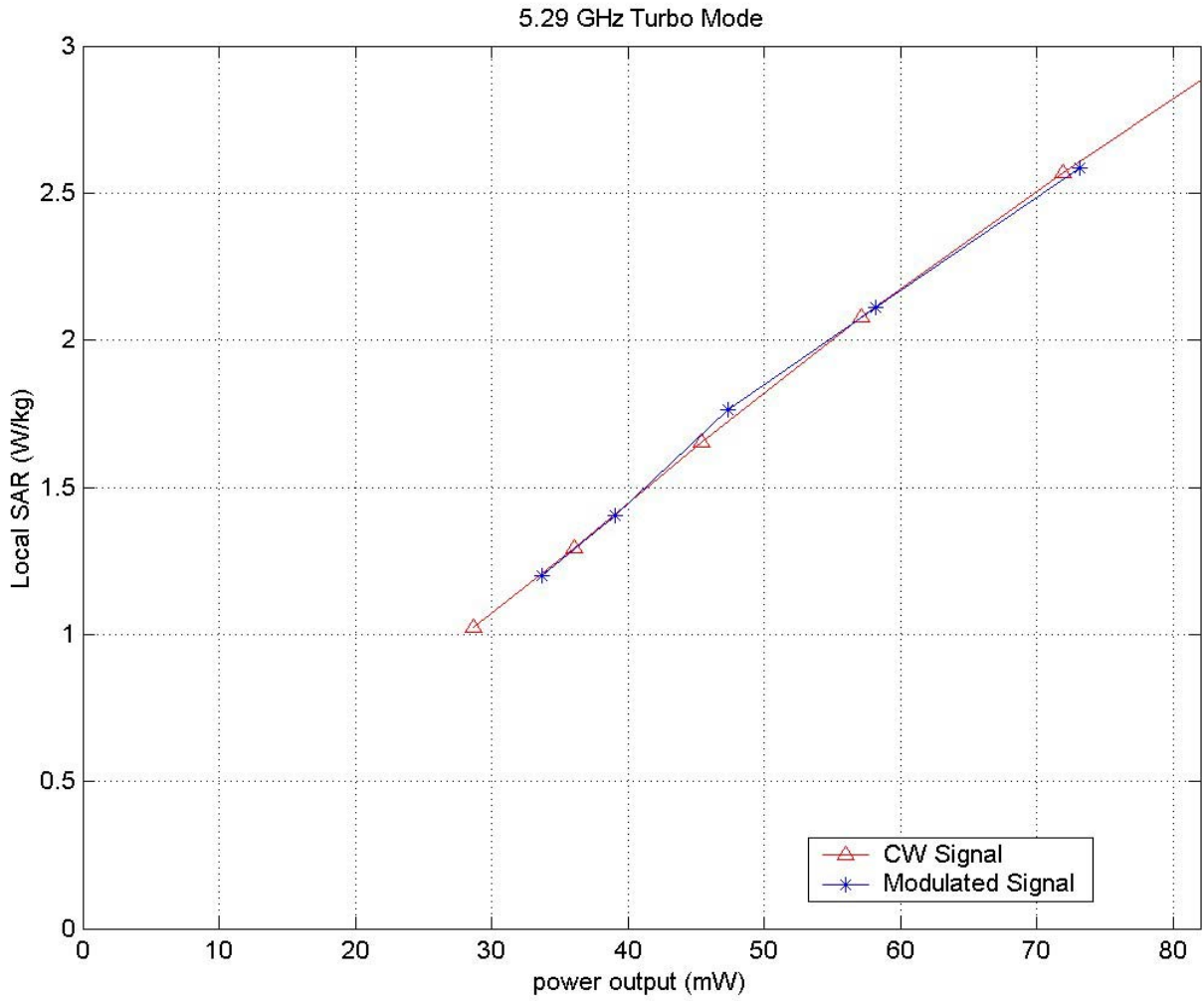


Fig. C. Comparison of the SAR for CW or OFDM modulated signals for the turbo mode at 5.29 GHz.

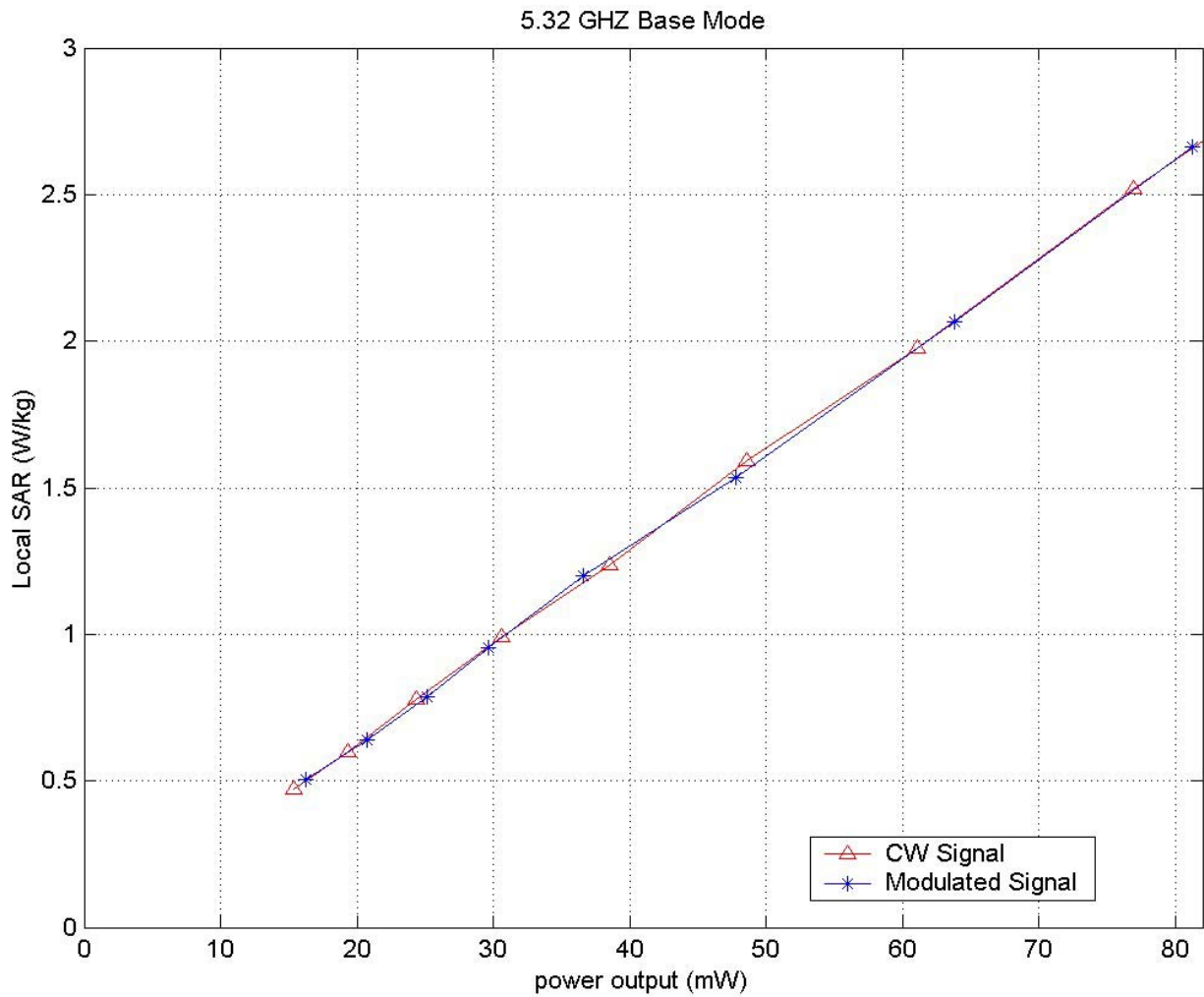


Fig. D. Comparison of the SAR for CW or OFDM modulated signals for the base mode at 5.32 GHz.

Table. A. The SAR measurement results fro the Askey computer corporation Model WLL 220 Mini PCI card built into Compal Model ACY 25 Notebook computer (FCC ID # H8NWLL220C).

Liquid temperature = $23.2 \pm 0.2^{\circ}\text{C}$
 Probe factor : $2.98 \text{ (mW/kg)}/\mu\text{V} \pm 2 \%$
 Measurement date: March 17, 2003

Configu-ration	Separation from Phantom (cm)	Frequency (GHz)	Mode	Average Conducted Output Power (dBm)		Antenna	1-g SAR (W/kg)
				Before	After		
1	0	5.26	Base	20.22	20.26	A	< 0.02*
						B	< 0.02*
	0	5.745	Base	18.92	18.95	A	< 0.02*
						B	< 0.02*
	0	5.29	Turbo	20.25	20.20	A	< 0.02*
						B	< 0.02*
	0	5.76	Turbo	18.88	18.84	A	< 0.02*
						B	< 0.02*
2	0	5.26	Base	20.22	20.18	A	0.512
						B	0.507
	0	5.745	Base	18.92	18.97	A	0.372
						B	0.348
	0	5.29	Turbo	20.25	20.21	A	0.350
						B	0.342
	0	5.76	Turbo	18.88	18.83	A	0.267
						B	0.226

* Too low to measure, within the noise limits of the SAR measurement system.